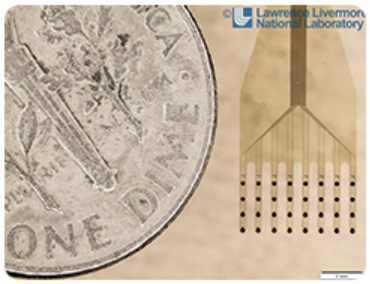
LIVERMORE LAB REPORT

A weekly compendium of media reports on science and technology achievements at Lawrence Livermore National Laboratory, Sept. 29-Oct. 3, 2014. Though the Laboratory reviews items for overall accuracy, the reporting organizations are responsible for the content in the links below.

NBC SCIENCE ON THE BRAIN



This image gives perspective on how tiny the electrode.

As part of President Obama's brain initiative, Lawrence Livermore scientists are playing a key role.

The Laboratory team will work with the University of California San Francisco and two small companies called Intan Technology and SpikeGadgets to make a little brain chip that can stimulate and record whole groups of individual neurons at once.

The team hopes to hook it up to use with what's called optogenetic stimulation, a technique that uses light-sensitive proteins and light to manipulate brain cells and record their activity -- perhaps, in the future, recording thoughts directly from the brain.

To read more, go to *NBC news*.

energycentral. A GUST OF FRESH AIR

Wind turbines can produce different amounts of power due to different "shapes" in the wind.

A $4.25 million Department of Energy grant to research wind farm modeling, transmission grid monitoring and the economics derived from wind-generated power has been awarded to the University of Wyoming (UW), which among others will be working with Lawrence Livermore.

The grant will support 12 researchers from UW as well as researchers from Montana Tech., Cornell University, Western Ontario University and four national government labs: the National Renewable Energy Laboratory, Sandia National Laboratories, Lawrence Livermore National Laboratory and Pacific Northwest National Laboratory .

The grant will be used to look at barriers for penetration of renewables into the electrical grid. Key researcher areas include:

--Development of and optimization of wind plant performance.
-- Development of a measurement-based transmission grid modeling capability.
-- Development of fully integrated economic models for more diverse and variable energy generation and transmission scenarios.

To read more, go to *energy central*.

Hydrogen is the lightest and simplest element and the main ingredient of the visible universe.

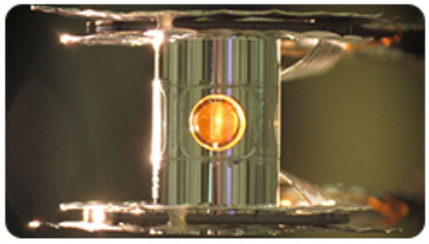
Lawrence Livermore scientists are working on a project that will use particles considerably smaller than the size of a human hair to improve the storage capacity of hydrogen-powered vehicles.

Using $1.2 million from the Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) over three years, LLNL scientist Brandon Wood said that through theory and modeling, his team will tackle the existing kinetic limitations when it comes to making the most efficient nanoparticles for onboard hydrogen storage.

The project began in July and involves additional participation from the University of Michigan and Georgia Tech, as well as experimental support from Sandia National Laboratories.

To read more, go to *Knowledge & Networking*.

The Cutting Edge REACHING FOR THE HOLY GRAIL



A metallic case called a hohlraum holds the fuel capsule for NIF experiments.

The power of the sun has edged a little closer to Earth, thanks to Lawrence Livermore scientists.

Under X-ray assault, the rapid implosion of a plastic shell onto icy isotopes of hydrogen has produced fusion and, for the first time, 170 micrograms of this superheated fusion fuel released more energy than it absorbed.

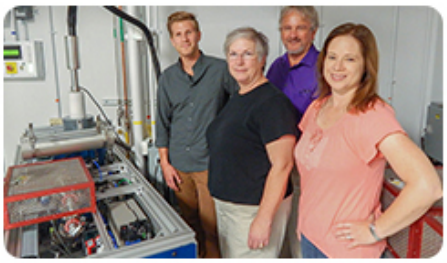
Experimental shots of the 192 lasers at the National Ignition Facility at Lawrence Livermore have reproduced such fusion at least four times since September 2013. The advance offers hope that someday in the far future scientists might reliably replicate the power source of the sun and stars.

"This is closer than anyone's gotten before, and it's unique to get out of the fuel as much energy as put in," says Livermore physicist Omar Hurricane, the LLNL scientist leading the project. "We got more fusion energy out of the DT fuel than we put in to the DT fuel."

To read more, go to *The Cutting Edge*.

PHYS.ORG

FROM RAGS TO RICHES



Members of the RAGS team with the apparatus. From left: Bill Cassata and Carol Velsko, primary RAGS operators and data analysts; Wolfgan Stoeffl, RAGS designer; and Dawn Shaughnessy, principal investigator for the project.

The Radiochemical Analysis of Gaseous Samples (RAGS) is a true trash to treasure story, turning debris from the National Ignition Facility's (NIF) target chamber into valuable data that helps to shape future experiments.

The RAGS diagnostic, developed for NIF by Sandia National Laboratories and commissioned in 2012, is a cryogenic system designed to collect the gaseous debris from the NIF target chamber after a laser shot, then concentrate, purify and analyze the debris for radioactive gas products. Radiation detectors on the apparatus produce rapid, real-time measurements of the radioactivity content of the gas. Based on the results of the counting, the total number of

radioactive atoms that were produced via nuclear reactions during a NIF shot can be determined.

If the number of target atoms in the fuel capsule and/or hohlraum (cylinder surrounding the fuel capsule) was known prior to the shot, then the results from RAGS determine the number of reactions that occurred, which in turn is used to determine the flux of particles that was produced by the capsule as it underwent fusion. This information is used to validate models of NIF capsule performance under certain shot conditions.

To read more, go to phys.org.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance. To send input to the *Livermore Lab Report*, send e-mail